

CLAIM AMENDMENTS

1-22 (cancelled)

~~23.~~<sup>1</sup> (Currently Amended) An ethylene copolymer which is a copolymer of ethylene and an  $\alpha$ -olefin of 3 to 20 carbon atoms and has the following properties:

(a) the melt index (MI2) at 190°C under a load of 2.16 kg is in the range of 0.0001 to 1000 g/10 min,

(b) the density is not more than 0.899 g/cm<sup>3</sup>,

(c) the relationship between a vinyl group amount and MI2 of the polymer satisfies the following expressions:

~~(vinyl group amount: number of vinyl groups/1000 carbon atoms)  $\leq 0.018038 + 0.003259 \times \log(\text{MI2})$ , and~~

(vinyl group amount: number of vinyl groups/1000 carbon atoms)  $\leq 0.004509 + 0.000815 \times \log(\text{MI2})$ ,

and

(d) the relationship between a vinylidene group amount and MI2 of the polymer satisfies the following expressions:

~~(vinylidene group amount: number of vinylidene groups/1000 carbon atoms)  $\leq 0.018038 + 0.003259 \times \log(\text{MI2})$ , and~~

(vinylidene group amount: number of vinylidene groups/1000 carbon atoms)  $\leq 0.013528 + 0.002445 \times \log(\text{MI2})$ .

~~24.~~<sup>2</sup> (Currently Amended) An ethylene copolymer which is a copolymer of ethylene and an  $\alpha$ -olefin of 3 to 20 carbon atoms and has the following properties:

(a) the melt index (MI2) at 190°C under a load of 2.16 kg is in the range of 0.0001 to 1000 g/10 min,

(b) the density is in the range of 0.875 to 0.899 g/cm<sup>3</sup>,  
and

(c) the relationship between a vinyl group amount and MI2 of the polymer satisfies the following expression ~~expressions~~:

~~(vinyl group amount: number of vinyl groups/1000 carbon atoms)  $\leq$  0.018038+0.003259xlog(MI2), and~~

(vinyl group amount: number of vinyl groups/1000 carbon atoms)  $\leq$  0.004509+0.000815xlog(MI2).

~~25.~~<sup>3</sup> (Previously presented) An ethylene copolymer which is a copolymer of ethylene, an  $\alpha$ -olefin of 3 to 20 carbon atoms and a cycloolefin and has the following properties:

(a) the cycloolefin content is not less than 0.01 % by mol,

(b) the melt index (MI2) at 190°C under a load of 2.16 kg is in the range of 0.0001 to 1000 g/10 min,

(c) the relationship between a vinyl group amount and MI2 of the polymer satisfies the following expression:

(vinyl group amount: number of vinyl groups/1000 carbon atoms)  $\leq$  0.018038+0.003259xlog(MI2),

and

(d) the relationship between a vinylidene group amount and MI2 of the polymer satisfies the following expression:

(vinylidene group amount: number of vinylidene groups/1000 carbon atoms)  $\leq 0.018038 + 0.003259 \times \log(\text{MI2})$ .

~~26.~~<sup>4</sup> (Previously presented) The ethylene copolymer as claimed in claim 25, wherein the ethylene copolymer further has the following properties:

the relationship between a vinyl group amount and MI2 of the polymer satisfies the following expression:

(vinyl group amount: number of vinyl groups/1000 carbon atoms)  $\leq 0.004509 + 0.000815 \times \log(\text{MI2})$ ,

and

the relationship between a vinylidene group amount and MI2 of the polymer satisfies the following expression:

(vinylidene group amount: number of vinylidene groups/1000 carbon atoms)  $\leq 0.013528 + 0.002445 \times \log(\text{MI2})$ .

~~27.~~<sup>5</sup> (Previously presented) The ethylene copolymer as claimed in any one of claims ~~23~~<sup>1</sup> to ~~26~~<sup>4</sup>, wherein regio-regularity of the  $\alpha$ -olefin of 3 to 20 carbon atoms, as measured by  $^{13}\text{C}$ -NMR, satisfies the following expression:

$$T_{\alpha\beta} / (T_{\alpha\beta} + T_{\alpha\alpha}) \leq 0.25 - 0.0020x$$

wherein  $T_{\alpha\beta}$  is a peak intensity of a carbon atom having branches at the  $\alpha$ -position and the  $\beta$ -position in the  $^{13}\text{C}$ -NMR spectrum,  $T_{\alpha\alpha}$

is a peak intensity of a carbon atom having branches at both of the  $\alpha$ -positions, and x is an ethylene content (% by mol) in the polymer.

~~28.~~<sup>6</sup> (Previously presented) The ethylene copolymer as claimed in claim ~~23,~~<sup>1</sup> wherein regio-regularity of the  $\alpha$ -olefin of 3 to 20 carbon atoms, as measured by  $^{13}\text{C}$ -NMR, satisfies the following expression:

$$T_{\beta\gamma}/(T_{\beta\gamma}+T_{\beta\beta}) \leq 0.30-0.0015x$$

wherein  $T_{\beta\gamma}$  is a peak intensity of a carbon atom having branches at the  $\beta$ -position and the  $\gamma$ -position in the  $^{13}\text{C}$ -NMR spectrum,  $T_{\beta\beta}$  is a peak intensity of a carbon atom having branches at both of the  $\beta$ -positions, and x is an ethylene content (% by mol) in the polymer.

~~29.~~<sup>7</sup> (Previously presented) The ethylene copolymer as claimed in claim ~~23,~~<sup>1</sup> wherein the molecular weight distribution (Mw/Mn), as measured by GPC, is in the range of 1.2 to 10.

~~30.~~<sup>8</sup> (Previously presented) The ethylene copolymer as claimed in claim ~~23,~~<sup>1</sup> wherein the molecular weight distribution (Mw/Mn), as measured by GPC, is in the range of 1.6 to 10.

~~31.~~<sup>9</sup> (Previously presented) The ethylene copolymer as claimed in claim ~~23,~~<sup>1</sup> which satisfies the expression  $MI_{10}/MI_2 < (M_w/M_n) + 5.55$ .

~~32.~~<sup>10</sup> (Currently Amended) The ethylene copolymer as claimed in claim ~~23,~~<sup>1</sup> which satisfies the expression  $MI_2 > 19.009 \times (\eta)^{-5.2486}$  where  $\eta$  is intrinsic viscosity determined by the formula  $\eta = \eta_{sp} / (C(1 + 0.28\eta_{sp}))$  where  $\eta_{sp}$  is specific viscosity and C is solution concentration g/dl as measured in decalin at 135 °C at a concentration of about 1 mg/ml.

~~33.~~<sup>11</sup> (Previously presented) The ethylene copolymer as claimed in claim ~~23,~~<sup>1</sup> wherein the ash content in the ethylene copolymer is not more than 1000 ppm.

~~34.~~<sup>12</sup> (Previously presented) The ethylene copolymer as claimed in claim ~~23,~~<sup>1</sup> wherein the titanium element content in the ethylene copolymer is not more than 10 ppm, and/or the zirconium element content in the ethylene copolymer is not more than 10 ppm.

~~35.~~<sup>13</sup> (Previously presented) The ethylene copolymer as claimed in claim ~~23,~~<sup>1</sup> which is a copolymer prepared by forming not less than 50 % of chain transfer by the addition of hydrogen.

~~36.~~<sup>14</sup> (Previously presented) A molded product comprising the ethylene copolymer of claim ~~23.~~<sup>1</sup>

~~37.~~<sup>15</sup> (Previously presented) A resin modifier comprising the ethylene copolymer of claim ~~23.~~<sup>1</sup>

~~38.~~<sup>16</sup> (Currently Amended) A composition comprising the ethylene copolymer of claim ~~23.~~<sup>1</sup> optionally together with a thermoplastic polymer.

~~39.~~<sup>17</sup> (Previously presented) The composition as claimed in claim ~~38.~~<sup>16</sup> wherein the thermoplastic polymer is a polyolefin.

~~40.~~<sup>18</sup> (Previously presented) The composition as claimed in claim ~~38.~~<sup>16</sup> wherein the weight ratio of the ethylene copolymer to the thermoplastic polymer is in the range of 0.01/99.99 to 99.99/0.01.

~~41.~~<sup>19</sup> (Previously presented) A molded product comprising the ethylene copolymer composition of claim ~~38.~~<sup>16</sup>

~~42.~~<sup>20</sup> (Previously presented) An ethylene copolymer which is a copolymer of ethylene and an  $\alpha$ -olefin of 3 to 20 carbon atoms and has the following properties:

(a) the melt index (MI2) at 190°C under a load of 2.16 kg is in the range of 0.0001 to 1000 g/10 min,

(b) the density is not more than  $0.899 \text{ g/cm}^3$ ,

(c) the relationship between a vinyl group amount and MI2 of the polymer satisfies the following expression:

(vinyl group amount: number of vinyl groups/1000 carbon atoms)  $\leq 0.018038 + 0.003259 \times \log(\text{MI2})$ ,

and

(d) the relationship between a vinylidene group amount and MI2 of the polymer satisfies the following expression:

(vinylidene group amount: number of vinylidene groups/1000 carbon atoms)  $\leq 0.018038 + 0.003259 \times \log(\text{MI2})$ , and

wherein the ash content in the ethylene copolymer is not more than 1000 ppm.

~~43.~~ <sup>21</sup> (Previously presented) An ethylene copolymer which is a copolymer of ethylene and an  $\alpha$ -olefin of 3 to 20 carbon atoms and has the following properties:

(a) the melt index (MI2) at  $190^\circ\text{C}$  under a load of 2.16 kg is in the range of 0.0001 to 1000 g/10 min,

(b) the density is not more than  $0.899 \text{ g/cm}^3$ ,

(c) the relationship between a vinyl group amount and MI2 of the polymer satisfies the following expression:

(vinyl group amount: number of vinyl groups/1000 carbon atoms)  $\leq 0.018038 + 0.003259 \times \log(\text{MI2})$ ,

and

(d) the relationship between a vinylidene group amount and

MI2 of the polymer satisfies the following expression:

(vinylidene group amount: number of vinylidene groups/1000 carbon atoms)  $\leq 0.018038 + 0.003259 \times \log(\text{MI2})$ , and

wherein the titanium element content in the ethylene copolymer is not more than 10 ppm, and/or the zirconium element content in the ethylene copolymer is not more than 10 ppm.

44. <sup>22</sup> (Previously presented) An ethylene copolymer which is a copolymer of ethylene and an  $\alpha$ -olefin of 3 to 20 carbon atoms and has the following properties:

(a) the melt index (MI2) at 190°C under a load of 2.16 kg is in the range of 0.0001 to 1000 g/10 min,

(b) the density is not more than 0.899 g/cm<sup>3</sup>,

(c) the relationship between a vinyl group amount and MI2 of the polymer satisfies the following expression:

(vinyl group amount: number of vinyl groups/1000 carbon atoms)  $\leq 0.018038 + 0.003259 \times \log(\text{MI2})$ ,

and

(d) the relationship between a vinylidene group amount and MI2 of the polymer satisfies the following expression:

(vinylidene group amount: number of vinylidene groups/1000 carbon atoms)  $\leq 0.018038 + 0.003259 \times \log(\text{MI2})$ ,

which is a copolymer prepared by forming not less than 50 % of chain transfer by the addition of hydrogen.